State of Maryland

BOARD OF NATURAL RESOURCES

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GALEN H. MAXFIELD

February, 1950

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MARYLAND COMMERCIAL FISH HATCHERY OPERATIONS, 1948 AND 1949

GENERAL

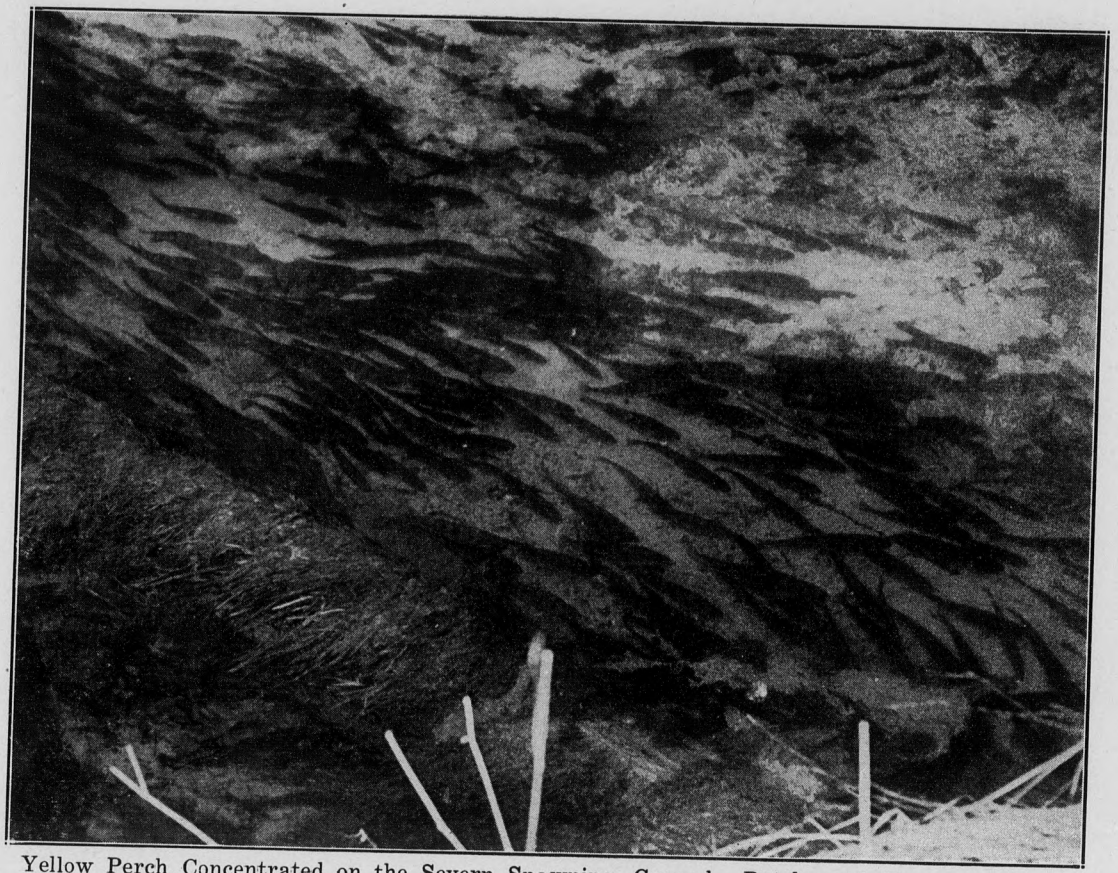
Maryland's commercial fish hatchery operations during the seasons 1948 and 1949 were confined to the propagation of the yellow perch, *Perca flavescens,* on Severn Run, and to the shad, *Alosa sapidissima,* at the Fort Belvoir Station on the Potomac River. Five special workers were employed to aid in the combined hatchery operations during each year of the biennium. In addition, the Fish and Wildlife Service supplied three workers and the equipment at the Belvoir Station. The perch fry produced in both hatchery seasons were released in tidewater streams throughout the State, with the greatest number being planted in Severn Run. The shad fry were released in the Patuxent, North East, Susquehanna, Chester, Choptank and Potomac rivers. Some shad fry were placed in experimental ponds for research purposes.

The stations and field operations during the two periods on which this report is based were under the supervision of Captain Harvey Mister, while the general supervision of hatchery work was under Galen H. Maxfield, in which Coit M. Coker aided.

YELLOW PERCH

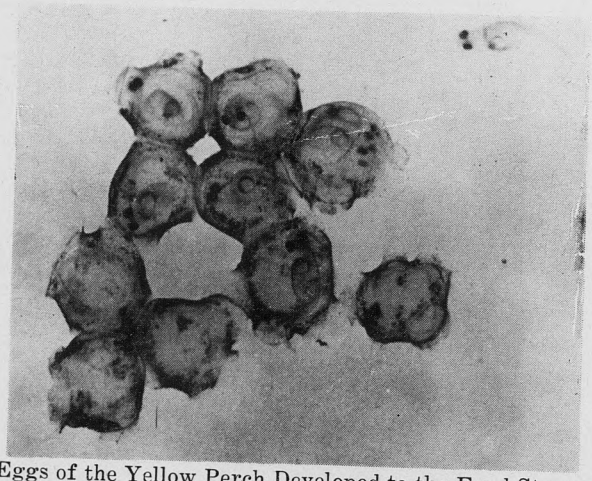
The yellow perch hatchery at the head of the Severn River, as already indicated, was operated during both seasons of the biennium. The box system of hatching was employed as in former years. Male perch were present in numbers on the spawning ground when operations began March 1, 1948. Female perch appeared the following weekend. First spawning occurred on March 9th. The mild winter of 1948-1949 effected an early spawning run during the 1949 season, in that spawning had already begun by March 1st.

The following table summarizes the spawning data for the 1948 and 1949 yellow perch seasons. Data presented for the 1949 season are for the observed spawning period, March 1st to the 15th. Despite the early



Yellow Perch Concentrated on the Severn Spawning Ground. Batches of Eggs are Shown in Upper Parts of the Picture. (Photo Courtesy of *Baltimore News-Post*)

spawning run in 1949, weather retarded the rise of temperature of the water, thus to prolong the spawning period which ended on March 15th.



Eggs of the Yellow Perch Developed to the Eyed Stage.

TABLE I

COMPARATIVE DATA ON YELLOW PERCH SPAWNING AT SEVERN RUN—1948 AND 1949

Year	First Spawning	Spawning Period	Peak of Spawning	Average Temperature
1948	March 9	March 9-24	March 15-18	45.2° F.
1949	.....	March 15	March 7-11	40.5° F.

Totals of 158,400,000 and 153,600,000 yellow perch eggs were incubated during the 1948 and 1949 seasons, respectively. The incubation period during 1948 averaged 20 days, with an average daily water temperature of 46.9° F. First hatching in 1948 occurred on March 29th and it continued through April 5th. As in the case of the lengthened spawning period, the period of incubation of the eggs in 1949 was prolonged to an average of 24 days. The average daily water temperature during this period was 44.0° F. First hatching occurred on March 28th, and continued through April 1st.

The table below summarizes the incubation data for the 1948 and 1949 seasons.

Yellow Perch Concentrated on the Severn Spawning Ground. Batches of Eggs are Shown in Upper Parts of the Picture. (Photo Courtesy of *Baltimore News-Post*)

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The table below summarizes the incubation data for the 1948 and 1949 seasons.

TABLE II

COMPARATIVE DATA ON YELLOW PERCH HATCHING AT SEVERN RUN 1948 AND 1949

Year	Total Eggs	Period of Incubation	Date of First Hatching	Temperature During Incubation	
				Average	Range
1948	158,400,000	March 9 - April 9	March 29	46.9°F	36.9-55.0°F
1949	153,600,000	March 4 - April 1	March 28	44.0°F	37.4-57.6°F [1]

[1] Average water temperature during the period of incubation, March 4-April 1, 1949, was erroneously reported as 47.4° F., and temperature range was reported as 40.5°-57.6° F., in the Annual Report for 1949 of the Department of Research and Education, Educational Series No. 23, by R. V. Truitt.

Hatching efficiency of yellow perch eggs was high, it being 85% in 1948 and 90% in 1949. A total of 134,640,000 fry was produced in 1948, and 138,240,000 in 1949. Tables III and IV list the distribution of the yellow perch fry produced during the biennium.

SHAD

Activities concerned with the propagation of shad during the period here reported were carried on, as already indicated, in cooperation with the U. S. Fish and Wildlife Service in continuation of a program that was initiated in 1940. Previous to 1948, Maryland furnished three spawn-takers and a boat in return for a portion of the shad fry produced. The fry so obtained were distributed principally to the Patuxent River in an effort to build up the depleted shad runs which had been quite low for many years. During the biennium, 1948-1949, Maryland participated on a much larger scale than theretofore, in that five hatchery workers and supervision were provided and funds made available for the purchase of shad eggs, while the Service supplied three workers and hatchery facilities.

The periods of egg collection during the 1948 and 1949 seasons closely approximated each other. The first eggs were taken, both seasons, on April 17th. The last eggs were taken on May 19th, and on May 20th, in 1948 and 1949, respectively.

The 1948 shad season was more advanced in that the principal egg collection period was from April 22nd to May 1st, when 13,970,000 eggs, or 73.4% of the season's total, were obtained for incubation. The principal egg collection period during the 1949 season was from April

27th to May 6th, when 12,095,000 eggs were taken for incubation, or 59% of the total for the season. The mean water temperature during these periods for 1948 and 1949 were 58.6° F. and 60.1° F., respectively. Maximum numbers of eggs taken for one evening were 1,961,000 on April 29, 1948, with a mean water temperature of 57.0° F., and 2,686,000 eggs on May 3, 1949, with a mean water temperature of 62.7° F.

Shad eggs purchased on a salvage basis from the commercial fishermen in 1948 amounted to 23,917,000. An additional 217,000 eggs were gathered by the hatchery crew, making a total of 24,134,000 eggs handled during the 1948 season. Of this number, 2,992,000 eggs in an advanced stage of incubation were distributed as follows: 1,148,000 were transported by air from the Potomac River hatchery to Damariscotta Mills, Maine; 1,016,000 were planted in suitable areas of the Potomac River, and 828,000 eggs were transported to an experimental rearing pond located at Lewistown, Maryland. The remaining 21,142,000 eggs were incubated during the season.

It is of interest that successful transportation of shad eggs took place by air from the Potomac River hatchery to Damariscotta Mills, Maine, with no appreciable mortality during the six hours and forty-seven minutes en route. However, these eggs were destroyed several days after delivery because of water supply troubles at that point. It had been planned by Maine authorities to hatch the eggs at Damariscotta Mills and plant them in the Abagadassett and the Dyer rivers in an effort to restore the shad runs in these rivers. The waters in question previously had been surveyed and determined satisfactory for shad fry stocking. It was hoped by the officials that through this means shad might be re-established in the many streams of Maine now non-productive, in which program the Belvoir hatchery was pleased to cooperate.

Due to the failure of the water supply at one brief period in the 1948 operations, it was necessary to plant all incubating eggs then on hand, a total of 1,016,000, in suitable areas of the Potomac River. As already indicated, approximately 828,000 eggs were transported during the 1948 season to an experimental rearing pond located at Lewistown, Maryland. It was assumed that these eggs did not hatch, since repeated towing failed to recover larvae from the pond.

All shad eggs were purchased from the commercial fishermen as a salvage operation during the 1949 season. A total of 22,930,000 eggs was incubated during the season.

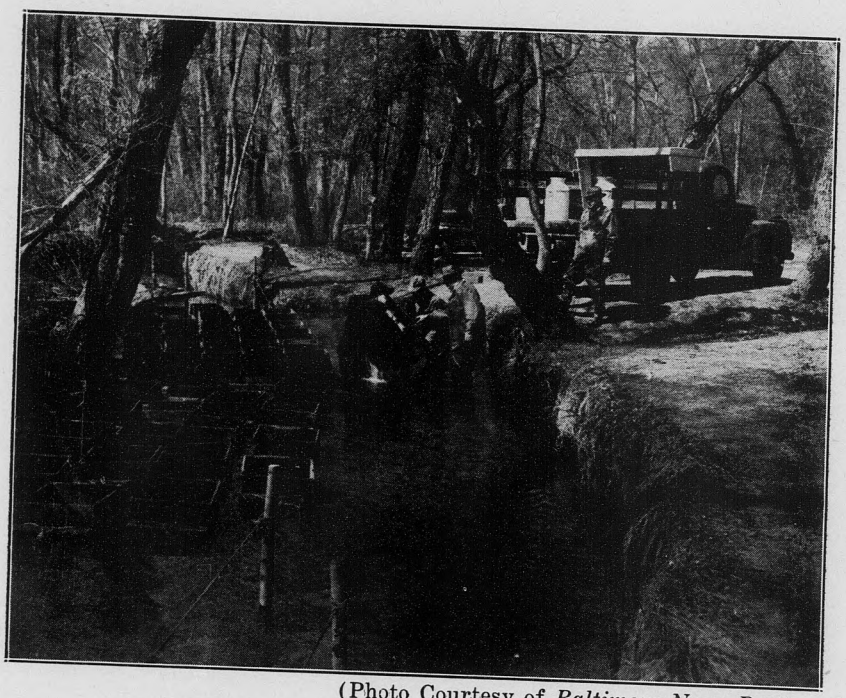
Totals of 19,027,800 and 20,637,000 shad fry were produced during the 1948 and 1949 seasons. Hatchery efficiency in both seasons was 90%. Table II shows the distribution of the fry produced during the biennium. The water-supply failure in 1948 caused a mortality of 152,000 fry.

An investigation was initiated in 1948 to determine if possible the point at which hatchery produced, pond-cultured shad larvae start to consume food organisms, that is, whether before the absorption of the yolk sac or after, and if following absorption, how soon thereafter. In addition, this study is attempting to determine the types of food first consumed, together with the food changes according to age and size of the young shad through the first summer of life. For these purposes, shad larvae produced at Fort Belvoir hatching station were planted in a previously fertilized outdoor rearing pond located at the State Fish Hatchery, Lewistown, Maryland. The results to date appear to throw some light on the problem of early feeding of shad.

DISCUSSION

Limiting yellow perch fry production effort to the Severn Run, and of shad fry effort to the Fort Belvoir Station is based upon the results of investigation of the commercial fish hatcheries since 1940. Yellow perch fry produced at Severn Run can be distributed with little mortality to all tidewater streams of Maryland to meet the needs in streams where there is not a sufficiency of brood stock. The cooperative agreement with the Fish and Wildlife Service in operating the shad hatching station at Fort Belvoir on the Potomac is economically desirable, while the circulating water and jar system of hatching shad makes for higher hatching efficiency and produces hardier shad larvae. The value of commercial fish hatcheries in rehabilitating the fisheries has been seriously questioned. A high degree of efficiency in artificial propagation has been attained, yet the fish culturist has been forced to release the fry while still in a helpless larval stage. This is done to avoid excessive mortalities in the hatching boxes or tanks. It is held by many

observers, however, that release of shad fry in the helpless larval stage may lead to excessive mortality due to the inability of the young fish to protect themselves.



(Photo Courtesy of *Baltimore News-Post*)

Yellow Perch Hatchery Boxes on Severn Run.
Attendants are shown transferring fry to a can of the type used in transporting them to streams for stocking.

The Patuxent River was chosen in 1940 as a test stream in an experiment to determine the value of shad fry planting over an extended period. The Patuxent, isolated, possessing a distinct broad stock and about fished out, was ideal for the study. Since the 1940 season, with the exception of 1941, from 1,500,000 to 3,000,000 shad fry have been planted in the river annually. Analysis of shad catches to date fails to show an appreciable degree of recovery in the Patuxent.

Maryland in the past has reared some of its shad fry to fingering size before releasing to public waters. More recently, techniques of tagging pond-reared fingering shad have been in course of development at the

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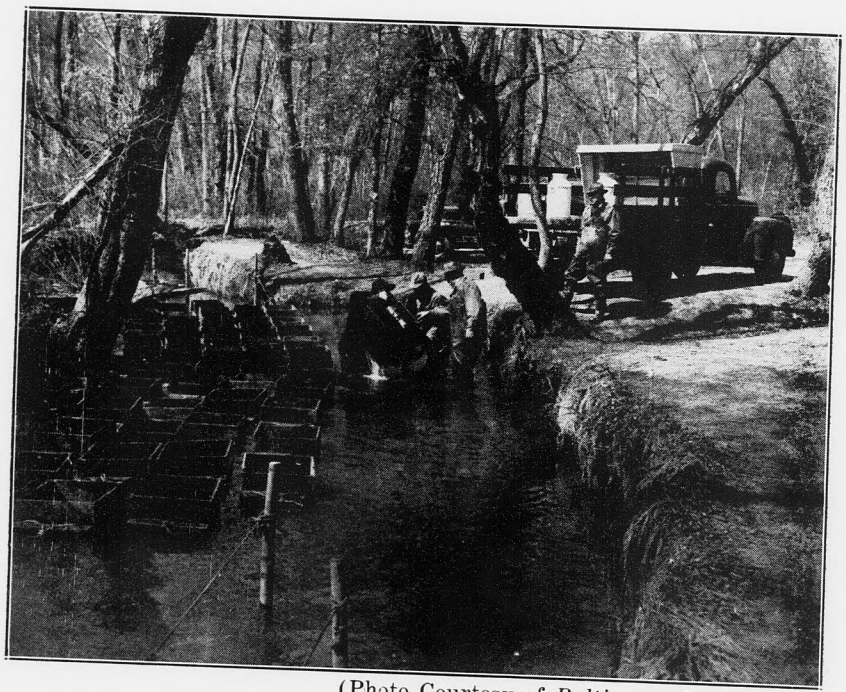

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Chesapeake Biological Laboratory in cooperation with the U. S. Fish and Wildlife Service. The successful tagging of sufficient numbers of young shad will provide valuable information lacking in the early life history of the fish and of the time spent in the ocean.

During the biennium a study was made of the feeding habits of shad fry under conditions of an artificial impoundment. The developmental stages of the shad during the critical period immediately following hatching were studied in relation to food intake as a factor in survival. Data accumulated from these studies are to be organized, interpreted, and printed in due time.

TABLE III

YELLOW PERCH FRY PLANTINGS IN MARYLAND WESTERN SHORE, 1948 AND 1949

	1948	1949
ANNE ARUNDEL COUNTY:		
Severn Run	55,440,000	59,840,000
Furnace Branch Creek	800,000	800,000
Morley Creek	1,600,000	800,000
Stoney Creek	1,200,000	800,000
Rock Creek	800,000	800,000
Magothy River	2,000,000	800,000
South River (Broad Creek)	800,000	800,000
West River	800,000	800,000
Dividing Creek	.....	800,000
BALTIMORE COUNTY:		
Herring Run	800,000	800,000
Stemmers Run	800,000	800,000
Middle River	800,000	1,600,000
Bird River	1,200,000	800,000
Gunpowder Falls	1,200,000	800,000
Little Gunpowder Falls	800,000	800,000
CALVERT COUNTY:		
Lyons Creek	800,000	800,000
Hall Creek	800,000	800,000
Hunting Creek	800,000	800,000
Battle Creek	800,000	800,000
St. Leonards Creek	800,000	800,000
CHARLES COUNTY:		
Mattawoman Creek	800,000	800,000
Nanjemoy Creek	800,000	800,000
Ward's Run	800,000	800,000
Mill Run	800,000	800,000
Port Tobacco Creek	800,000	800,000
Zekiah Swamp	800,000	.....
Gilbert Swamp	800,000	.....
Wicomico River	800,000	.....

TABLE III—Continued

HARFORD COUNTY:		
Conowingo Pool	6,000,000	3,000,000
Little Gunpowder Falls	800,000	800,000
Bush River	1,200,000	800,000
Swan Creek	1,200,000	800,000
Deer Creek	.....	2,000,000
PRINCE GEORGE'S COUNTY:		
Patuxent River (Priest Bridge)	800,000	800,000
Patuxent River (Western Branch)	800,000	800,000
Piscataway Creek	800,000	800,000
Honson Creek	800,000	800,000
Oxon Run	800,000	800,000
ST. MARY'S COUNTY:		
Budd's Creek	800,000	800,000
Chaptico Creek	800,000	800,000
St. Clement's Creek	800,000	800,000
McIntosh Run	800,000	800,000
St. Mary's River	800,000	800,000
Wicomico Creek	800,000	800,000
TOTALS	97,440,000	96,040,000

TABLE IV

YELLOW PERCH FRY PLANTINGS IN MARYLAND EASTERN SHORE, 1948 AND 1949

	1948	1949
CAROLINE COUNTY:		
Marshyhope Creek	800,000	800,000
Chapel Branch	800,000	800,000
Tuckahoe River	800,000	800,000
Watts Creek	800,000	800,000
Mill Creek	800,000	800,000
Hunting Creek	800,000	800,000
Piney Branch	800,000	.....
CECIL COUNTY:		
Conowingo Pool	.....	3,000,000
North East Creek	800,000	1,200,000
Elk River	1,200,000	800,000
Bohemia River	800,000	800,000
Sassafrass River	800,000	600,000
DORCHESTER COUNTY:		
Blackwater River	800,000	800,000
Transquaking River	800,000	800,000
Chicacomico River	.....	800,000
Nanticoke River	.....	800,000
Marshyhope Creek	400,000	800,000
Hunting Creek	400,000	.....
KENT COUNTY:		
Chester River	800,000	800,000
Sassafrass River	800,000	600,000
Morgan Creek	800,000	800,000

TABLE IV—Continued

Langford Bay Creek	800,000	800,000
Gray's Inn Creek	800,000	800,000
QUEEN ANNE COUNTY:		
Corsica River	800,000	800,000
Southeast Creek	800,000	800,000
Chester River	800,000	800,000
Tuckahoe River	.....	1,600,000
Norwich Creek	800,000	800,000
Wye Mills (Wye River)	.....	1,200,000
SOMERSET COUNTY:		
King's Creek	800,000	800,000
Manokin River	1,200,000	800,000
Dividing Creek	800,000	800,000
Pocomoke River	.....	1,200,000
Wicomico River	800,000	.....
Wicomico Creek	400,000	.....
TALBOT COUNTY:		
Wye Mills (Wye River)	800,000	1,200,000
Skipton Creek	800,000	800,000
Mill Creek	800,000	800,000
Tred Avon River	800,000	800,000
Miles River	800,000	800,000
Moore's Creek	800,000	800,000
Tuckahoe River	800,000	800,000
WICOMICO COUNTY:		
Wicomico Creek	400,000	800,000
Nanticoke River	800,000	800,000
Rewastico Creek	800,000	800,000
Tonytank Creek	800,000	800,000
Barren Creek	800,000	800,000
Quantico Creek	800,000	800,000
Wicomico River	800,000	.....
WORCESTER COUNTY:		
Pocomoke River	800,000	1,600,000
Dividing Creek	800,000	800,000
Trappe Creek	800,000	800,000
Wagram Creek	1,200,000	800,000
TOTALS	37,200,000	42,200,000

TABLE V

SHAD FRY PLANTINGS IN MARYLAND, 1948 AND 1949

Locality	1948	1949
Patuxent River	3,000,000	3,104,100
Susquehanna River	.....	5,292,900
North East River	2,000,000	2,060,100
Chester River	2,000,000	1,460,700
Choptank River	2,000,000	3.616,200
Potomac River	9,675,800	5,103,000
Rearing Ponds	200,000	.....
TOTAL	18,875,800	20,637,200

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